

What is claimed is:

1. A method of determining RPMs of a vehicle having a DC electrical system comprising the steps of:

- (a) sensing a signal on the electrical system of the vehicle;
- (b) separating an AC component of the signal;
- (c) identifying a frequency value in the AC component of the signal; and
- (d) converting the frequency value into an RPM value based on a predetermined relationship between frequency and RPM.

2. The method of claim 1, further comprising steps after step (b) of

- (b1) filtering the AC component of the signal;
- (b2) digitizing the AC component of the signal into a digital signal; and
- (b3) storing the digital signal.

3. The method of claim 1, wherein the frequency value is determined by spectrally decomposing the digital signal.

4. The method of claim 1, wherein the frequency value is determined by determining time between amplitude peaks in the AC component of the signal.

5. A system for determining RPMs of a vehicle having a DC electrical system , the system comprising:

(a) an electrical tap for electrically connecting to the electrical system of the vehicle;

(b) a high pass filter electrically connected to the tap for separating an AC component of the signal; and

(c) a processor electrically connected to the high pass filter for identifying a frequency value in the AC component of the signal, and converting the frequency value into an RPM value based on a predetermined relationship between frequency and engine RPM..

6. The system of claim 5 further comprising:

(d) an additional filter electrically connected to the high pass filter and the processor for filtering the AC component of the signal;

(e) an analog-to-digital converter electrically connected to the additional filter and the processor for digitizing the AC component of the signal into a digital signal; and

(f) a memory coupled to the processor for storing the digital signal.

7. The system of claim 6, the processor determining the frequency value by spectrally decomposing the digital signal.

8. The system of claim 5, the processor determining the frequency value by calculating time between amplitude peaks in the AC component of the signal.

9. The system of claim 5 wherein the tap connects to the electrical system via a electrical socket in a cab of the vehicle.

10. A method of instructing a driver of a vehicle to shift gears of the vehicle, the vehicle having a DC electrical system and the method comprising the steps of:

- (a) entering an RPM threshold value;
- (b) sensing a signal on the DC electrical system of the vehicle;
- (c) separating an AC component of the signal;
- (d) identifying a frequency value in the AC component of the signal;

(e) converting the frequency value into an RPM value based on a predetermined relationship between frequency and engine RPM;

(f) comparing the RPM value to the RPM threshold value;  
and

(g) instructing the driver to shift gears if the RPM value exceeds a value based on RPM threshold value.

11. A system for instructing a driver of a vehicle to shift gears of the vehicle, the vehicle having a DC electrical system, the system for instructing the driver comprising:

(a) a memory for storing an RPM threshold value;

(b) an electrical tap for electrically connecting to the DC electrical system of the vehicle;

(c) a high pass filter electrically connected to the tap for separating an AC component of the signal;

(d) a processor electrically connected to the high pass filter for identifying a frequency value in the AC component of the signal, converting the frequency value into an RPM value based on a predetermined relationship between frequency and engine RPM, and comparing the RPM value to a value based on the RPM threshold value;

(e) a user interface coupled to the memory for inputting the RPM threshold value and instructing the driver to shift

gears if the RPM value exceeds a level based on the RPM threshold value.

12. The system of claim 11 wherein the tap connects to the electrical system via a electrical socket in a cab of the vehicle.

13. A method of instructing a driver of a vehicle to shift gears of the vehicle, the vehicle having a DC electrical system and the method comprising the steps of:

- (a) repeatedly estimating a current instantaneous power propelling the vehicle;

- (b) storing the current instantaneous power if it is a maximum instantaneous power since a most recent shift in gears;

- (c) comparing a difference between the maximum instantaneous power and the current instantaneous power to a predetermined threshold; and

- (d) instructing the driver to shift gears if the difference exceeds a level based on the predetermined threshold.

14. The method of claim 13 further comprising steps of :

entering an RPM threshold value;

comparing a measured RPM value to the RPM threshold value; and

instructing the driver to shift gears if the RPM value exceeds a level based on the RPM threshold value.

15. A system for instructing a driver of a vehicle to shift gears of the vehicle, the vehicle having a DC electrical system, the system for instructing the driver comprising:

(a) an accelerometer for determining acceleration of the vehicle;

(b) a memory for storing a value for the mass of the vehicle;

(c) a processor electrically connected to the accelerometer and the memory for estimating a current instantaneous power propelling the vehicle using the value for the mass and the acceleration, determining if the current instantaneous power is a maximum instantaneous power since a most recent shift in gears; comparing a difference between the maximum instantaneous power and the current instantaneous power to a level based on a predetermined threshold; and

(d) a user interface coupled to the memory for entering the value for the mass of the vehicle and instructing the

driver to shift gears if the processor determines that the difference exceeds the level based on the predetermined threshold.

16. The system of claim 15, the processor comparing a measured RPM value to an RPM threshold value; and the user interface instructing the driver to shift gears if the RPM value exceeds a level based on the RPM threshold value.

17. A method of instructing a driver of a vehicle to shift gears of the vehicle, the vehicle having a DC electrical system, and the method comprising the steps of:

- (a) providing gear ratios for the vehicle;
- (b) providing an engaged gear of operation;
- (c) repeatedly estimating a current instantaneous power propelling the vehicle for the engaged gear;
- (d) calculating a projected power output value at a matching RPM for the next higher gear;
- (e) comparing a difference between the current instantaneous power and the projected power output value; and
- (f) instructing the driver to shift to the next higher gear if the difference exceeds a level based on a predetermined threshold.

18. The method of claim 17 further comprising steps of :

entering an RPM threshold value;

comparing a measured RPM value to the RPM threshold value; and

instructing the driver to shift to the next higher gear if the RPM value exceeds a level based on the RPM threshold value.

19. A system for instructing a driver of a vehicle to shift gears of the vehicle, the vehicle having a DC electrical system, the system for instructing the driver comprising:

(a) a memory for storing gear ratios and an engaged gear of operation;

(b) a processor electrically connected to the memory for estimating a current instantaneous power propelling the vehicle for the engaged gear, calculating a projected power output value at a matching RPM for a next higher gear, and comparing a difference between the current instantaneous power and the projected power output value; and

(c) a user interface coupled to the processor for instructing the driver to shift to the next higher gear if the difference exceeds a level based on a predetermined threshold.



20. The system of claim 19, the processor comparing a measured RPM value to an a RPM threshold value; and the user interface instructing the driver to shift gears if the RPM value exceeds a level based on the RPM threshold value.